

*PERICLIMENES GONIOPORAE* SP. NOV. (CRUSTACEA:  
DECAPODA: PALAEMONIDAE),  
A NEW COELENTERATE-ASSOCIATED SHRIMP

A.J. BRUCE

Division of Natural Sciences, Northern Territory Museum,  
P.O. Box 4646, Darwin, Australia 0801

ABSTRACT

A new species of *Periclimenes* (Crustacea: Decapoda: Palaemonidae), from the Indian Ocean and Great Barrier Reef, is recorded. *P. goniopora* is primarily associated with scleractinian corals of the genus *Goniopora* and is closely related to *P. mahei* Bruce and *P. diversipes* Kemp. The name has appeared several times as a nomen nudum in the scientific literature since 1976 and is now validated. The distinguishing features of *P. goniopora* are described, illustrated and discussed.

KEYWORDS: Crustacea: Decapoda: Palaemonidae, *Periclimenes goniopora*, new species, nomen nudum validated, coral associate, Indo-West Pacific.

INTRODUCTION

In 1974, a description of a new shrimp was accepted for publication in a scientific journal. Despite several subsequent assurances that publication was imminent, the description remained unpublished. In the ensuing 15 years, the proposed name has unfortunately appeared in a number of other publications. The present communication will now regularize the use of the name and also provide some further relevant information on the same species. The reference numbers used in the 'material examined' section refer to the author's personal collection.

SYSTEMATICS

*Periclimenes goniopora* sp. nov.  
(Figs 1-3, 4A)

*Periclimenes diversipes* - Bruce 1976a:11 (non Kemp 1922).

*Periclimenes goniopora* - Bruce 1976b: 476 (nomen nudum), 1977:5 (nomen nudum), 1981:16, 17 (nomen nudum), 1983a:165 (nomen nudum), 1983b: 208 (nomen nudum).

**Type material.** The ovigerous female (#2157) is selected as holotype and deposited in the collection of the Northern Territory Museum, Darwin, NTM. Cr.006745, together

with further paratype specimens (#2162, 2476). Paratypes are also deposited in the collections of the Rijksmuseum van Natuurlijke Historie, Leiden, D37691, and the National Museum of Natural History, Washington, USNM 243226.

**Additional examined.** Kenya: (i) 1 male, 1 female, stn. 101, Ras Iwatine, Mombasa, 4°0.75'S 39°43.8'E, L.W.S., 13 January 1971, (#1354). (ii) 1 female, stn. 119, Ras Iwatine, Mombasa, 4°1.15'S 39°43.8'E, L.W.S., 26 July 1971, (#1535). (iii) 1 ovig. female, stn. 126, Shimoni, 4°39.25'S 39°03.5'E, L.W.S., 8 August 1971 (#1561). (iv) 1 male, 1 ovig. female, stn. 132, Ras Iwatine, Mombasa, 4°00.8'S 39°44.2'E, L.W.S., 3 October 1971 (#1601). (v) 1 ovig. female, stn. 180, Ras Iwatine, Mombasa, 4°01.15'S 39°43.78'E, L.W.S., 7 April 1974 (#2157). (vi) 5 male, 4 female, 1 ovig. female, stn. 180b, Ras Iwatine, Mombasa, 4°01.75'S 39°43.78'E, L.W.S., 11 April 1974 (#2162).

Australia: (vii) 1 ovig. female, Heron Island, Queensland, stn. DF-5, reef slope, 6.5m, 21 July 1976, coll. D. Fisk (#2423). (viii) 1 male, Heron Island, Queensland, L.W.S., coll. A.J. Bruce, (#2476). (ix) 1 ovig. female, Heron Island, Queensland, L.W.S., 30 March 1978, coll. D. Fisk (#2600).

**Description.** A small sized shrimp of about 1cm length, of slender, subcylindrical body

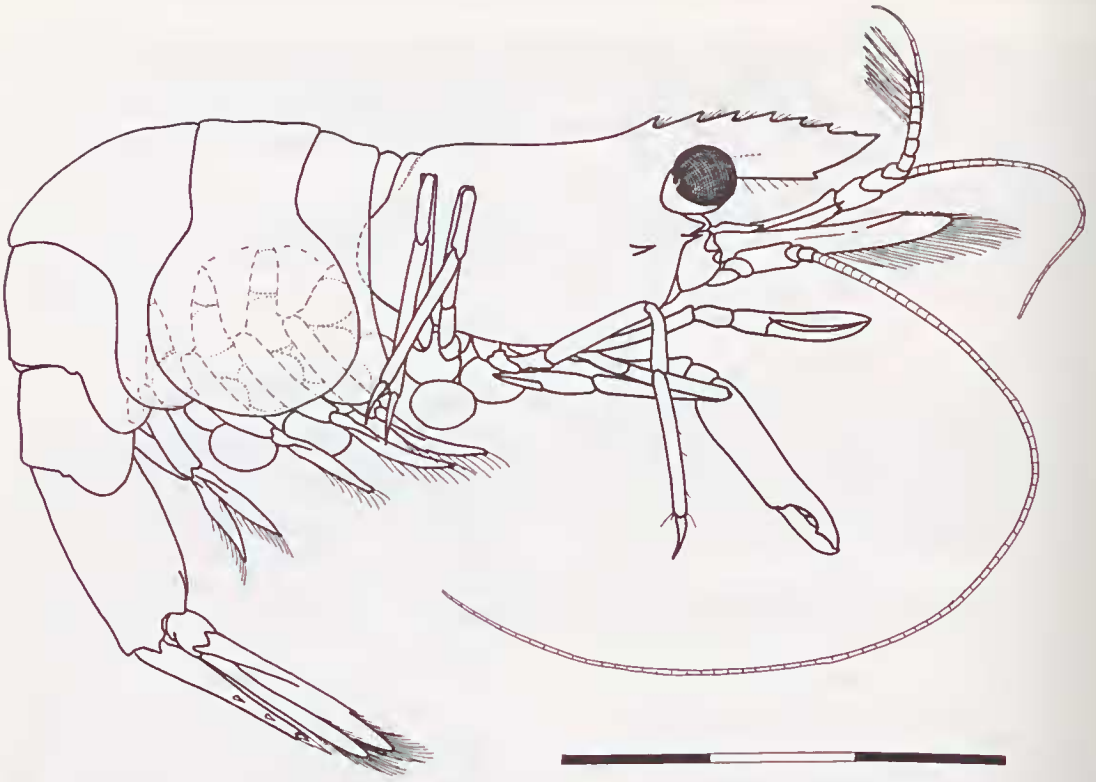


Fig. 1. *Periclimenes goniopora* sp. nov., ovigerous female holotype, Ras Iwatine, Kenya. Scale bar in millimetres.

form, generally very similar in morphology to *Periclimenes diversipes* Kemp, 1922, so that a fully detailed description appears unnecessary. The following abbreviated description is based on Kenyan specimens.

Carapace smooth, with well developed rostrum, straight, horizontal, slightly exceeding intermediate segment of antennular peduncle, dorsal carina deep with dorsal margin straight or slightly convex, with 5-8 acute teeth, first generally situated slightly behind level of posterior orbital margin; ventral carina with proximal lower margin straight, setose, with single acute tooth at 0.75 of length, (very small or absent in some specimens), distal lower border convex, upcurved; orbit obsolete, inferior orbital angle acutely produced, antennal spine well developed, marginal, hepatic spine similar to antennal, on slightly lower level, anterolateral branchiostegite not produced, bluntly rounded.

Abdomen and caudal fan as in *P. diversipes*. Telson with two pairs of dorsal spines, small, at 0.5 and 0.75 of telson length; three pairs of posterior spines.

Eyes, antennae and mouthparts as in *P. diversipes*. Second maxilliped without

podobranch. Third maxilliped with rudimentary arthrobranch, with single lamella only. First to third thoracic sternites moderately broad, fourth sternite broad, without slender median process, with low transverse ridge with small median notch, fifth to seventh sternites broadening posteriorly, unarmed.

First pereiopods slender, exceeding caropocrite by length of chela and carpus; chela with palm subcylindrical, slightly compressed, about 2.0 times longer than deep, fingers about 0.75 of palm length, slender, tapering, slightly compressed, with slightly laterally situated, entire cutting edges and small feebly hooked blunt tips; carpus about 1.5 times length of chela, gradually expanding distally, length about 6.5 times longer than distal width; merus subcylindrical, subequal to carpal length; ischium and basis as in *P. diversipes*; coxa with minute medial process.

Adult females with second pereiopods very unequal, dissimilar; major second pereiopod exceeds basicrite by carpus and chela; chela with palm subcylindrical, smooth, slightly compressed, about 3.4 times longer than wide; fingers equal to about 0.6 of palm length, dactylus 4.0 times longer than proximal depth,

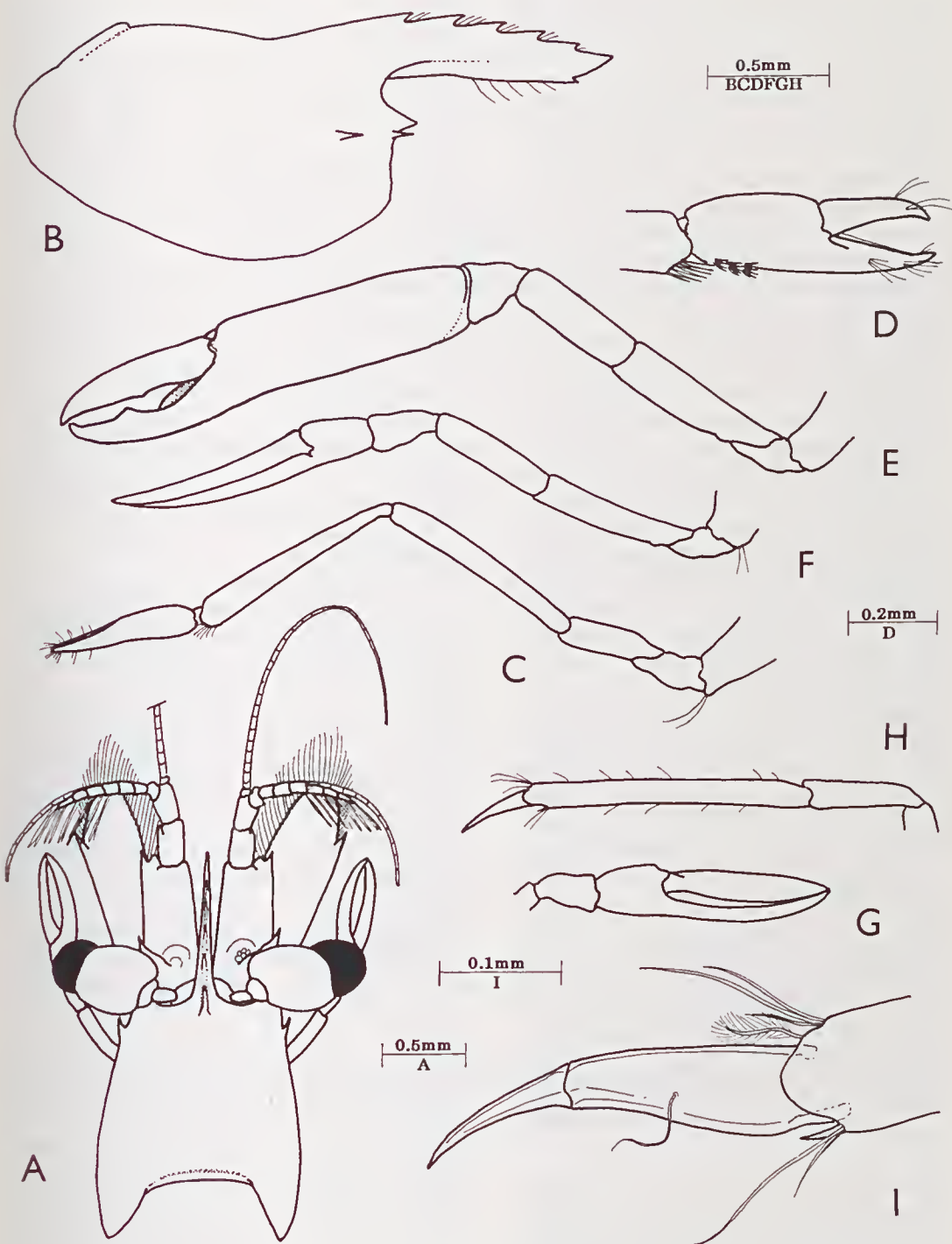


Fig. 2. *Periclimenes goniopora* sp. nov., Ras Iwatine, Kenya. A, carapace, antennae, eyes, second pereiopods, dorsal aspect. B, carapace and rostrum, lateral. C, first pereiopod. D, same, chela. E, major second pereiopod. F, minor second pereiopod. G, same, chela. H, third pereiopod, dactyl, propod and carpus. I, same, dactyl and distal carpus. AB, male paratype. C-I, female holotype.

compressed, with small acute hooked tip, distal half of cutting edge straight, sharp, with feeble tooth proximally, proximal half sinuous, blunt; fixed finger curved, with small blunt tooth distally, central part of cutting edge with large deep U-shaped diastema, with large acute teeth distally, distal cutting edge sharp, straight; proximal to diastema, cutting edge shallowly grooved with elevated medial carina; carpus short, stout, about as long as distal width, about 0.25 of palm length, distally expanded, unarmed; merus subcylindrical, moderately compressed, 0.5 of palm length, 3.0 times longer than wide, feebly tapered proximally, unarmed; ischium about 1.3 times length of merus, 4.0 times longer than wide, feebly tapered proximally, unarmed; basis and coxa normal. Minor second pereopod exceeds basicerite by chela and carpus; chela about 0.65 of major chela length, palm short, stout, about 0.25 of major chela palm length, 1.6 times longer than distal width, fingers 3.0 times longer than palm length, 1.3 times length of fingers of major chela, slightly bowed and scooped, cutting edges straight, entire, dactylus with small acute hooked tip distally, fixed finger with pair of small blunt protuberances distally; carpus, merus and ischium similar to major chela, more slender. Male second pereopods subequal, similar, closely resembling minor second pereopod of female, very short, reaching only to middle of intermediate segment of antennular peduncle.

Ambulatory pereopods slender, third exceeding basicerite by dactyl, propod and carpus; dactyl slender, compressed, about 4.5 times longer than proximal width, unguis distinctly demarcated, about 0.6 of corpus length; propod about 3.3 times length of dactyl, 10.5 times longer than wide, uniform, with single small distoventral setiform spine only; corpus, merus, ischium, basis and coxa as in *P. diversipes*. Fourth pereopod similar to third, fifth with single preterminal ventral spine on propod.

The Australian specimens show no significant differences from the Kenyan material. The single male specimen has the second pereopods unequal, and very similar to the Kenyan females. Rostrum with only four acute dorsal teeth, with acute tip relatively longer, rostrum subequal to postorbital carapace length. Chela of major second pereopod slightly longer than carapace length. Third pereopod with dactylus about 0.36 of propod

length, with very slender unguis, equal to about 0.76 of corpus length, corpus without evident setae. Male first pleopod with endopod about 0.5 of exopod length, distal 0.6 broadly expanded, with small acute lobe on medial margin distally, with five short simple spines on proximal third; distal and medial margins broadly rounded, non-setose. Second pleopod with endopod about 0.3 of exopod length, with appendices at 0.33 of medial margin; appendix masculina with corpus feebly tapering distally, about 4.7 times longer than proximal width, with two long terminal spines, about 0.8 of corpus length, with five spines of decreasing length proximally along the lateral margin.

**Measurements** (mm). Holotype female: postorbital carapace length, 1.9; carapace and rostrum, 3.45; total body length (approx.) 10.0; major chela 1.6; minor chela, 0.95; length of ovum, 0.5. Allotype male: postorbital carapace length, 1.2.

**Colouration**. Generally highly transparent. Ovigerous female with small groups of white chromatophores on ophthalmic somite, across sternites of seventh and eighth thoracic segments and, as broad transverse band, slightly swollen centrally, across centre of third abdominal somite; two small groups of white chromatophores present ventrally on second abdominal somite, with further small group on third sternite and pleura of third abdominal somite; minute red chromatophores scattered around bases of antennal peduncles, over ventral aspects of first to third abdominal segments and on peduncles of pleopods; gastric mill, hepatopancreas covered with white chromatophores; ovary translucent white, feebly speckled with red; cornea whitish; small group of white chromatophores present distally on carpus, merus and ischium of third to fifth pereopods; first and second pereopods, caudal fan transparent.

**Host**. The type specimens, and all others from Ras Iwatine, were found in association with scleractinian coral *Goniopora stutchburyi* Wells, and the specimens from Shimoni were associated with *Lobophyllia* sp. The Heron Island specimens were found in association with *Goniopora tenuidens* Milne-Edwards & Haime, *Galaxea fascicularis* (L.), *Porites cylindrica* Dana, and *Montipora* sp.

**Habitat**. Specimens were generally collected from protected lagoon sites at low water spring tide level to 0.5 m. The Heron Island

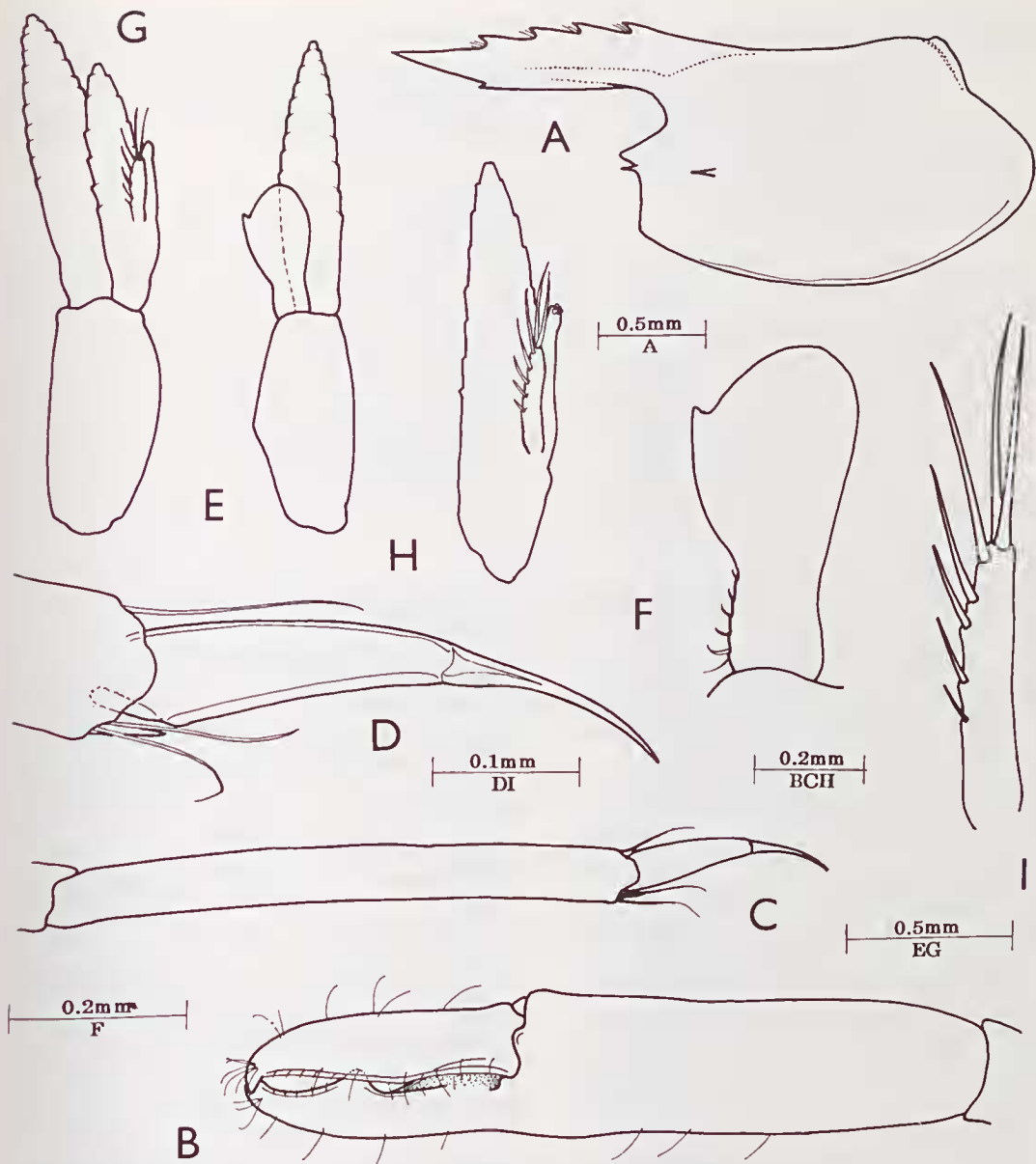


Fig. 3. *Periclimenes goniopora* sp. nov., male paratype, CL 1.3 mm, Heron Island, Queensland. A, carapace and rostrum, lateral. B, chela of major second pereiopod. C, third pereiopod, propod and dactyl. D, same, dactyl and distal propod. E, first pleopod. F, same, endopod. G, second pleopod. H, same, endopod. I, same, appendix masculina.

specimen (# 2423) from *Montipora* was collected from 6.5m. Water temperature at the Kenyan sites was 28°C.

**Associated fauna.** The Kenyan specimens from *Lobophyllia* were associated with four small juvenile specimens of *Periclimenes brevicarpalis* (Schenkel).

**Distribution.** Type locality, Ras Iwatine, Mombasa, Kenya. Also known from Watamu

and Shimoni, Kenya; La Réunion; Heron Island, Great Barrier Reef.

**Systematic Position.** *Periclimenes goniopora* is a member of a small group of closely related coelenterate-associated species of the genus, consisting of *P. diversipes* Kemp, 1922, *P. jugalis* Holthuis, 1952, *P. mahei* Bruce, 1969, *P. madreporae* Bruce, 1969, *P. kemp* Bruce, 1969, *P. watamuae* Bruce, 1976

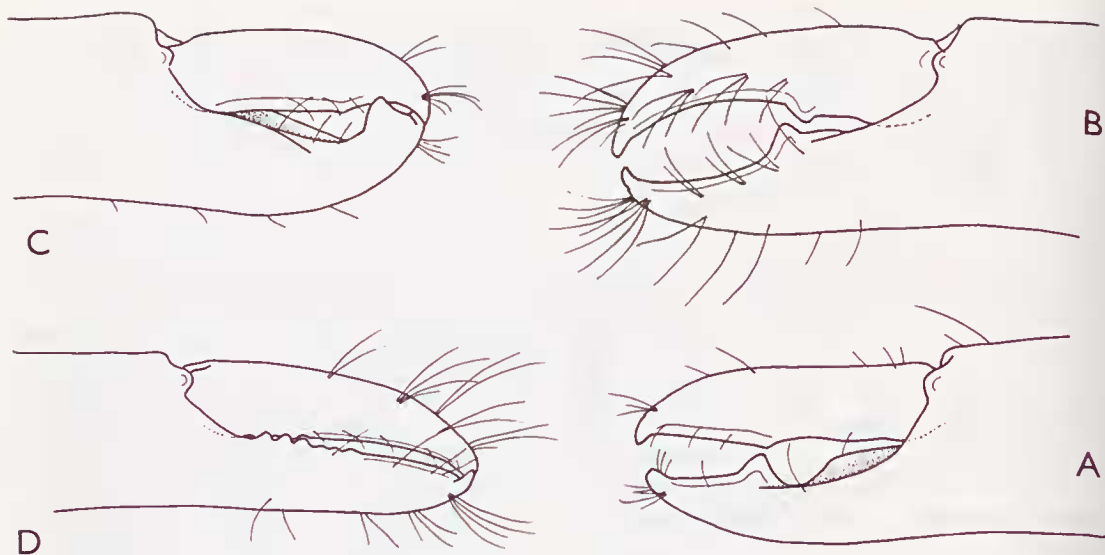


Fig. 4. Fingers of ovigerous females major second pereiopod. A, *Periclimenes goniopora* sp. nov. B, *Periclimenes mahei* Bruce. C, *Periclimenes diversipes* Kemp. D, *Periclimenes madrepora* Bruce.

and *P. difficilis* Bruce, 1976a. Of these, *P. goniopora* is most closely related to, and occupies a systematic position intermediate between *P. diversipes* and *P. mahei*.

The species of this group are most readily identified on the basis of the morphology of the chela of the major second pereiopod of ovigerous female specimens, the identification of isolated males with undeveloped major chelae and juveniles, except by association, is much more difficult and often not possible. In this respect, *P. goniopora* shows a degree of chela modification that is constant and characteristic, based on the position and the degree of development of the tooth on the cutting edge of the fixed finger. *P. mahei* appears to represent the least specialized form of chela, with the fixed finger tooth at about the middle of the length of the cutting edge, with the sharp distal cutting edge distinctly concave. The dactylus has a well developed blunt tooth at about 0.4 of the cutting edge length, with the sharp distal cutting edge also concave, so that the closed fingers of the chela distinctly gape distally. The fixed finger is only very feebly cannulate proximally. *P. goniopora* has a larger, more acute tooth at about 0.6 of the fixed finger length, with the sharp distal cutting edge straight, rather than concave, and the proximal cutting edge deeply cannulate, with a raised lateral carina, separated from the main tooth by a deep U-shaped diastema. The dactylus has only a small blunt tooth at about 0.5 of

the length of its cutting edge, with the proximal edge being feebly sinuous, blunt, the distal edge straight, sharp. The closed fingers do not gape significantly. *P. diversipes* shows the most extreme modification. The tooth on the fixed finger is very large and acute, and occupies a position at about 0.8 of the length of the cutting edge, adjacent to the hooked tip of the finger, with the whole of the proximal cutting edge deeply emarginate and strongly cannulate, with a long low lateral carina. The dactylus has an obsolescent tooth at about 0.6 of the cutting edge length, with the short distal cutting edge sharp, slightly convex, the proximal cutting edge straight, blunt. The closed fingers gape slightly proximally to the tooth on the fixed finger. The minor second pereiopods in these species are essentially similar but differ slightly in proportions. In *P. goniopora* the fingers are about 3.0 times the palm length and the carpus is subequal to the palm. In *P. diversipes*, the fingers are about 1.7 times the palm length and the carpus is about 1.5 times the palm length. In *P. mahei* the chela of the minor second pereiopod is subequal and similar to that of the major pereiopod (Bruce 1969, 1976b), with the fingers distinctly shorter than the palm.

The most simple means of distinguishing *P. goniopora* from *P. diversipes* is by means of its characteristic pattern of white patches, which is quite lacking in *P. diversipes*, and which readily attracts the eye in the field. This

contrasts strongly with *P. diversipes*, which is mainly transparent, with inconspicuous fine red striae along the abdominal pleura. The colour pattern of *P. mahei* is as yet unknown.

## DISCUSSION

The group of *Periclimenes* species to which *P. goniopora* belongs are all of small size and with coelenterate associations and all, except *P. kemp*, which is found on alcyonarians, are commensals of scleractinian corals. *P. diversipes* has been found on the widest variety of hosts and is generally the commonest and most widely distributed species. It associates most characteristically with corals of the family Acroporidae, including *Acropora tenuis* and *A. variabilis*.

*Periclimenes goniopora*, *P. kemp* and several related species appear to be from a natural group that is relatively easy to recognise but difficult to define precisely so as to exclude some other species of *Periclimenes* that do not appear to be closely related. Such a species is the distinctly larger *P. affinis* (Zehntner), a crinoid-associated shrimp, which appears closely related to others of similar habits, but, in contrast to them, has a simple dactyl on the ambulatory pereopods, due probably to the loss of the usual accessory tooth found in the other species. *P. jugalis* Holthuis, 1952, is probably a member of this group, although it occurs in deeper water (13m) and its associates are unknown. Most of the species presently referred to this group occupy intertidal or shallow water habitats.

The *P. diversipes* group of species may be provisionally defined as small sized pontonine shrimps, generally with well developed deep rostra with 4-9 dorsal teeth, 0-2 ventral teeth, without epigastric or supraorbital spines, orbit obsolete, inferior orbital angle produced, without inner flange, antennal and hepatic spines acute; third abdominal segment not posterodorsally produced; telson normal; antennae normal; eye with globular cornea, stalk without proximal articular lobe; ophthalmic segment without "bec ocellaire"; first pereopods with simple fingers; second pereopods generally unequal, most marked in adult females, subequal in some males, dissimilar or similar, chela smooth, carpus unarmed, merus without distoventral tooth; ambulatory pereopods with dactyls short,

simple, propods feebly spinulate; associated with coelenterates. The species may be distinguished by the following key.

### Key for the identification of adult females of *Periclimenes diversipes* and related species

1. Fourth thoracic sternite unarmed.....2  
Fourth thoracic sternite with large linguiform median plate; R. 7/0.....  
.....*P. difficilis* Bruce
2. Fingers of major second pereopod dentate, non-spatulate.....3  
Fingers of major second pereopod non-dentate spatulate.....7
3. Second pereopods generally with chelae subequal, similar.....4  
Second pereopods generally with chelae unequal, dissimilar.....5
4. Major second pereopod with carpus about 0.6 of palm length; propods of ambulatory dactyls distoventrally distinctly spinulate; R.8/2.....*P. jugalis* Holthuis  
Major second pereopod with carpus less than 0.5 of palm length; ambulatory propods with small distoventral spinule only; R.6/1.....*P. madreporae* Bruce
5. Fixed finger of major second pereopod with tooth at less than 0.8 of length.....6  
Fixed finger of major second pereopod with large acute tooth at about 0.8 of length, separated by deep notch from tip, dactylar tooth obsolete; R.5-7/0-2.....  
.....*P. diversipes* Kemp
6. Major second pereopod with fixed finger tooth large, acute, at about 0.6 of length, with large gap proximally; dactylar tooth obsolete, distal cutting edge more or less straight; R.5-7/0-1.....  
.....*P. goniopora* sp. nov.  
Major second pereopod with fixed finger tooth at about 0.5 of length, blunt, with large gap proximally; dactylar tooth distinct, blunt, distal cutting edge concave; R.6-7/1.....*P. mahei* Bruce
7. Major second pereopod with fingers not exceeding palm length (0.3-0.6 times); R.6-8/1-2.....*P. kemp* Bruce  
Major second pereopod with fingers distinctly exceeding palm length (1.2-2.0 times); R.5/0-1.....*P. watamuae* Bruce

## REFERENCES

- Bruce, A.J. 1969. Preliminary description of sixteen new species of the genus *Periclimenes* Costa, 1844 (Crustacea, Decapoda Nantantia, Pontoniinae). *Zoologische Mededelingen (Leiden)* **43**(20):253-278.
- Bruce, A.J. 1972. A review of information upon the coral hosts of commensal shrimps of the subfamily Pontoniinae Kingsley, 1878 (Crustacea, Decapoda, Palaemonidae). Proceeding of a Symposium on Corals and Coral Reefs, 1969. Marine Biological Association of India, 399-418, figs 1-2.
- Bruce, A.J. 1976a. A report on a small collection of shrimps from the Kenya National Marine Parks at Malindi, with notes on selected species. *Zoologische Verhandelingen (Leiden)* **145**:1-72.
- Bruce, A.J. 1976b. A synopsis of the pontoniinid shrimp fauna of central East Africa. *Journal of Marine Biological Association of India* **16**(2):462-490.
- Bruce, A.J. 1977. The hosts of coral associated Indo-West Pacific pontoniine shrimps. *Atoll Research Bulletin* **205**:1-19.
- Bruce, A.J. 1978. A report on a collection of pontoniine shrimps from Madagascar and adjacent waters. *Zoological Journal of the Linnean Society* **62**:205-290.
- Bruce, A.J. 1981. Pontoniine shrimps from Heron Island. *Atoll Research Bulletin* **245**:1-33.
- Bruce, A.J. 1983a. A note on the pontoniine shrimp fauna of La Réunion. *Bulletin of Marine Science* **33**(1):165-166.
- Bruce, A.J. 1983b. The pontoniine shrimp fauna of Australia. *Australian Museum Sydney Memoirs* **18**:195-218.
- Holthuis, L.B. 1952. The Decapoda of the Siboga Expedition. Part XI. The Palaemonidae collected by the Siboga and Snellius Expeditions with remarks on other species. II. Subfamily Pontoniinae. *Siboga Expeditie, Monographie* **39a**<sup>10</sup>:1-110, tab. 1.
- Kemp, S. 1922. Notes on the Crustacea Decapoda in the Indian Museum. XV. Pontoniinae. *Records Indian Museum* **24**:113-288, pls 3-9.

Accepted: 24 July 1989